

What is Claimed Is:

1. A lamp assembly for use in measuring pressure on a surface painted with pressure sensitive paint, said lamp  
5 assembly comprising:

a housing;

a light source supported within the housing;

optical elements supported within the housing, said  
optical elements adapted for emitting light from said light  
10 source onto said surface for measuring pressure at said  
surface; and

a mount assembly for mounting said lamp assembly and  
adapted for positioning said lamp assembly in a selected  
pivotal position relative to said mount assembly.

15 2. The lamp assembly of Claim 1 wherein at least a  
portion of said housing comprises a generally bulbous outer  
surface, said mount assembly further comprising a ring adapted  
to surround said bulbous portion of the housing, said ring  
being releasably engageable with said bulbous outer surface  
20 for pivotally adjusting the position of said housing within  
said ring.

3. The lamp assembly of Claim 2 wherein said mount  
assembly further comprises brackets secured to said ring for  
mounting the mount assembly for said use of the lamp assembly.

25 4. The lamp assembly of Claim 1 wherein said housing is  
generally cylindrical, said mount assembly mounting said lamp  
assembly for releasably securing said lamp assembly in a  
selected pivotal position relative to the longitudinal axis of  
said housing.

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5. A lamp assembly for use in measuring pressure on a surface provided with pressure sensitive paint, said lamp assembly comprising:

a housing;

5 a light source supported within the housing;

optical elements supported within the housing, said optical elements adapted for emitting light from said light source onto said surface for measuring pressure at said surface; and

10 a cooling system, said cooling system further comprising a first airflow path within said housing for cooling said light source housing, and a second airflow path for cooling said optics.

6. The lamp assembly of Claim 5 further comprising:

15 a sleeve mounted within said housing, said sleeve having openings in its side wall, said housing and sleeve defining channels therebetween for the passage of air, at least one of said first and second airflow paths including at least portions of said channels.

20 7. The lamp assembly of Claim 6 wherein said light source and said optical elements are mounted within said sleeve, and said sleeve further comprises first openings in its side wall in the first airflow path for cooling said light source housing, and second openings in its side wall within  
25 second airflow path for cooling at least some of said optics.

8. The lamp assembly of Claim 7 further comprising a light source chamber within said sleeve in which is mounted said light source, said light source chamber being in said first airflow path.

30 9. The lamp assembly of Claim 5 further comprising an end cap assembly behind said light source and having at least one air inlet for the introduction of air to at least one of

said first and second airflow paths, said lamp assembly further comprising at least one air outlet for the exiting of the air from at least one of said first and second airflow paths.

5           10. The lamp assembly of Claim 8 wherein said light source further comprises a light source reflector, and wherein air in the first airflow path enters said light source chamber and then flows about said light source reflector before exiting said chamber.

10           11. The lamp assembly of Claim 5 wherein said housing is generally cylindrical, the internal surface of the housing having longitudinal circumferentially spaced recesses, said recesses defining at least a portion of at least one of said first and second airflow paths.

15           12. The lamp assembly of Claim 9 wherein said end cap is recessed to provide a gap between said end cap and said housing, said gap being in at least one of said first and second airflow paths.

20           13. The lamp assembly of Claim 9 further comprising a bulb socket mounted within said end cap, and a connector mounted in said end cap rearwardly of said socket, said socket, connector, and end cap defining at least in part a chamber in at least one of said first and second airflow paths.

25           14. A lamp assembly for use in measuring pressure on a surface painted with pressure sensitive paint, said lamp assembly comprising:

          a housing;

          a subassembly mounted within said housing;

30           said subassembly further comprising a light source and optical elements adapted for emitting light from said

light source onto said surface for measuring pressure at said surface; and

said subassembly being mounted within said housing for removal of said subassembly as a unit, including said  
5 light source and optics, from said housing.

15. The lamp assembly of Claim 14 wherein said subassembly further comprises a sleeve mounted within said housing, said light source and optical elements mounted within said sleeve, said sleeve, said light source and said optics,  
10 as a unit, being mounted within and removable from said housing.

16. The lamp assembly of Claim 15 further comprising an end cap assembly mounted to said housing, removal of said end cap assembly from said housing permitting removal of said  
15 subassembly.

17. The lamp assembly of Claim 16 wherein said light source and optical elements are in axial alignment with said optics located in the light path emitted from said light source, said housing having a forward and rearward end, said  
20 optics being located toward the forward end, and said light source being located toward the rearward end of the housing, said end cap assembly mounted to the housing rearwardly of said light source, whereby removal of the end cap from the housing allows removal of said subassembly from the rearward  
25 end of said housing.

18. The lamp assembly of Claim 14 wherein said light source is removable from said subassembly for changing the light source without requiring dismantling of said optical elements from said subassembly.

30 19. The lamp assembly of Claim 16 further comprising a socket into which said light source is connected when in use, said socket mounted within said end cap and removable from

said light source upon removing said end cap from said housing, said light source remaining with said subassembly upon removal of the end cap.

20. The lamp assembly of Claim 19 further comprising a  
5 connector mounted in an external wall of said end cap for connection to an electrical power source for delivering electrical power to the light source.

21. The lamp assembly of Claim 14 wherein said optical  
10 elements further comprise a fused silica window, a heat absorption filter, and a bandpass interference filter spaced axially relative to each other in the light path from the light source.

22. The lamp assembly of Claim 21 wherein said optical  
15 elements further comprise a diffuser spaced forwardly of said interference light filter in said light path.

23. The lamp assembly of Claim 14 wherein said optical  
elements are removable from said subassembly without removing said light source from said subassembly.

24. The lamp assembly of Claim 14 wherein said light  
20 source is removable from the subassembly without removing said optical elements from said subassembly.

25. The lamp assembly of Claim 14 wherein said housing  
and subassembly define airflow channels therebetween for the flow of air to cool said lamp assembly.

26. The lamp assembly of Claim 25 wherein said airflow  
25 channels are included in airflow paths for cooling said light source housing and said optical elements.

27. The lamp assembly of Claim 26 wherein said airflow  
paths have separate air outlets.

28. A lamp assembly for use in measuring pressure on a  
30 surface provided with pressure sensitive paint, said lamp assembly comprising:

a housing;

a subassembly mounted within said housing, said subassembly comprising a sleeve, a light source, and optical elements, said light source and optical elements mounted  
5 within said sleeve, with said optical elements in the light beam emitted by said light source; and

airflow paths within said sleeve for the flow of air past said light source and at least some of said optical elements.

10 29. The lamp assembly of Claim 28 wherein said sleeve has an outer wall extending generally in the direction of said light beam from said light source, said outer wall having openings within said airflow paths.

15 30. The lamp assembly of Claim 29 further comprising first and second airflow paths within said sleeve, the wall of said sleeve having first openings in said first airflow path and second openings in said second airflow path, said light source being in said first airflow path and at least some of said optical elements being in said second airflow path.

20 31. The lamp assembly of Claim 30 wherein the directions of said first and second airflow paths are generally transverse of the direction of the light beam from the light source.

25 32. The lamp assembly of Claim 31 further comprising first and second air outlets, air from said first airflow path exiting the lamp assembly through said first air outlet, and the air from said second airflow path exiting the lamp assembly through said second air outlet.

30 33. The lamp assembly of Claim 32 further comprising airflow channels between said housing and said sleeve, an air inlet to said lamp assembly, said air inlet communicating with at least one of said airflow channels, and at least one other

of said airflow channels communicating with at least one of said air outlets.

34. The lamp assembly of Claim 33 wherein said at least one airflow channel that communicates with said air inlet also  
5 communicates with at least one of said airflow paths, and the other of said at least one airflow channels that communicates with at least one of said air outlets communicates with at least one of said airflow paths.

35. The lamp assembly of Claim 34 wherein said airflow  
10 channels extend generally parallel to said light beam from said light source.

36. A lamp assembly for use in measuring pressure on a surface provided with pressure sensitive paint, said lamp assembly comprising:

15 a housing;  
a light source supported within the housing;  
optical elements supported within the housing, said optical elements adapted for emitting light of a specified wavelength from said light source onto said surface for  
20 measuring induced fluorescent radiation at said surface; and  
a cooling system, said cooling system further comprising air flow paths for cooling said light source and said optics.

37. The lamp assembly of Claim 36 wherein said light  
25 source further comprises a quartz halogen bulb.

38. The lamp assembly of Claim 36 wherein said light source further comprises a bulb and reflector assembly.

39. The lamp assembly of Claim 38 wherein said optical elements further comprise a fused silica window for shielding  
30 the bulb from the cooling air flow.

40. The lamp assembly of Claim 39 wherein said fused silica window absorbs infrared radiation beyond about 3.5

microns wavelength.

41. The lamp assembly of Claim 36 wherein said optical elements further comprise a heat absorption filter that absorbs radiant energy beyond about 700 nm.

5 42. The lamp assembly of Claim 36 wherein said optical elements further comprise a diffuser for spreading the light field into a cone of light that is nominally uniform in space and stable in intensity.

43. The lamp assembly of Claim 39 wherein said light  
10 source comprises a quartz halogen bulb, and said fused silica window shields the quartz halogen bulb from cooling air flow.

44. The lamp assembly of Claim 36 wherein said optical elements further comprise a bandpass interference filter, and a heat absorption filter that reduces the radiant heat flux  
15 incident on the bandpass interference filter.

45. The lamp assembly of Claim 36 wherein said light source further comprises an integrated bulb with reflector, at least one of said air flow paths cooling the back side of said reflector but not said bulb.

20 46. The lamp assembly of Claim 36 wherein said light source further comprises a bulb and reflector assembly, and wherein said optical elements further comprise:

a fused silica window for shielding the bulb of the bulb and reflector assembly from the cooling air flow;

25 a heat absorption filter that absorbs radiant energy beyond a selected wavelength;

a bandpass interference filter; and

a diffuser for spreading the light field from said light source and other optical elements into a cone of light  
30 that is uniform and stable in intensity;

said fused silica window absorbing infrared radiation beyond a selected wavelength, and said heat



absorption filter absorbing radiant energy beyond a selected wavelength, thereby reducing the radiant heat flux incident on the bandpass interference filter.

5 47. The lamp assembly of Claim 46 wherein said fused silica window absorbs infrared radiation beyond about 3.5 microns wavelength.

48. The lamp assembly of Claim 47 wherein said heat absorption filter absorbs radiant energy beyond about 700nm.

10 49. The lamp assembly of Claim 48 wherein said bandpass interference filter transmits light at a wavelength in the blue light range.

50. The lamp assembly of Claim 46 wherein the bulb of the bulb and reflector assembly is a quartz halogen bulb with integrated reflector assembly.

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